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DISEASES DUE TO PROTOZOAN PARASITES.

NIESCHULZ (O.). Ueber die Möglichkeit biologischer Surrabekämpfung. Zoologische Beiträge zum Surraproblem Nr. XIII. [**The Possibility of the Biological Control of Surra. Zoological Contribution to the Surra Problem. No. XIII.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* Vol. 26. (Series D. Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 380–385. [From a reprint.]

The introduction of Bayer 205 has rendered possible a reduction in the outbreaks of surra among horses, but the eradication of the disease is still a problem on account of the presence of infected cattle and buffaloes which are clinically healthy.

Nieschulz, during a tour of Java and Sumatra, considered the possibility of tackling the problem on biological lines.

In the first part of this brief paper the author summarizes our knowledge regarding the transmitting agents of surra, and concludes that the place of prime importance must be given to the Tabanidae, although it must be admitted that other insects play some part.

An attack upon the problem from a biological basis must therefore be aimed at destruction of Tabanidae.

In the second part of the paper the possibilities of achieving this in our present state of knowledge are touched upon. The Tabanidae are susceptible to attack in various stages of development, but it is admitted at once that attack upon the adult fly is out of the question altogether. So far, no one has been able to devise any practical and economical means of protecting animals against the bites of flies. In Java at least it is not practicable to paraffin the drinking places, nor can fly lime be spread on trees with any certainty of effect.

The natural enemies of the Tabanidae play a very small part in their destruction.

It is not practicable to collect the egg packets. Infection of eggs with Phanurus plays some part in their destruction, but in nature there appears to be a balance struck between the eggs and the parasite.

Generally speaking, so far as our present knowledge goes there is no biological method of attacking the problem of surra.

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NIESCHULZ (O.) & PONTO (S. A. S.). Zoölogische bijdragen tot het surraprobleem. XVIII. Over meervoudige infecties met *Tabanus striatus* Fabr. [**The Transmission of Surra by** *Tabanus striatus* **Fabr.**]—*Veeartsenijkundige Mededeeling No. 63. Dept. van Landbouw, Nijverheid en Handel.-Ned.-Indië.* 8 pp. 1927. Archipel Drukkerij-Buitenzorg.

Infected horses were used for the feeding of the flies, and guineapigs were used as test animals.

Flies were allowed to feed for 1 to 3 minutes, and they were then transferred to guineapigs. After a few seconds they began to feed. At the end of 45 seconds to a minute the feeding was interrupted again, and the flies were transferred to fresh guinea-pigs. Feeding was resumed within 7 seconds, and after 45 seconds to one minute feeding was again interrupted and the flies were transferred to a third lot of guineapigs.

In the first experiment 20 flies fed on the first guineapig, 14 on the second and on the third. Only the first two became infected.

In the second experiment 30 flies fed on the first, 18 on the second, and 12 on the third guineapig. All three became infected.

In the third test 30 flies fed on the first, 24 on the second and 17 on the third guineapig. All became infected.

In the fourth and last experiment the numbers of flies feeding on the three guineapigs were 20, 16 and 11. The first and third became infected.

NIESCHULZ (O.). Zoölogische bijdragen tot het surraprobleem. XIX. Overbrengingsproeven met Stomoxys, Lyperosia, Musca en Stegomyia. [**Experiments in the Transmission of Surra with Stomoxys, Lyperosia, Musca, and Stegomyia.**]—*Veeartsenijkundige Mededeeling No. 64. Dept. van Landbouw, Nijverheid en Handel.-Ned.-Indië.* 20 pp. 1927. Archipel Drukkerij-Buitenzorg.

The species of flies used in these experiments were *Stomoxys calcitrans*, *Lyperosia exigua*, *Musca inferior* and *Musca crassirostris* (belonging to the Philaematomyia group) and *Aëdes* (*Stegomyia*) *albopictus*.

Wild flies were used after they had been starved for ½ day to 1 day.

Native horses infected with trypanosomes which had not been passed through experimental animals were used for infective meals, and horses were used as test animals. 250 *Stomoxys calcitrans* were fed for 3 to 5 minutes, and after an interval of 10 to 60 seconds were fed for 2 to 7 minutes on a healthy animal. In a second experiment 250 flies were fed for 3 to 3½ minutes on an infected horse, and then after an interval of 19 to 90 seconds were transferred to a healthy animal, where they fed for 3 to 6 minutes.

The result in both cases was negative.

One hundred *Lyperosia exigua* were fed for 5 to 7 minutes on an infected horse, and after an interruption of 10 seconds to 2 minutes the flies were allowed to feed for 3 to 9 minutes on a healthy horse. The result was negative. An experiment in which 40 *Musca inferior* were fed for 7–8 minutes, and after an interval of ½ to 2 minutes on a healthy horse for 4 to 11 minutes yielded a negative retult. A second parallel experiment also had a negative result.

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No transmission followed an experiment in which 40 *Musca crassirostris* were used in a similar manner.

Two experiments with *Aëdes* (*Stegomyia*) *albopictus* failed.

AKAZAWA (S.), ITO (Sadataka) & KASAI (Katuya). **The Vacillation of the Wassermann and Sachs-Georgi Reaction in the Experimental Trypanosomiasis of Animals.**—*Jl. Jap. Soc. Vet. Sci.* 1928. Jan. Vol. 7. No. 1. pp. 83–85.

Horses, cattle and rabbits were inoculated with a trypanosome isolated from a water-buffalo in Formosa, which the authors believe is probably identical with *T. evansi*. The blood was tested weekly by the Wassermann and Sachs-Georgi methods. The two tests were found to give practically parallel results.

Complement-fixation tests generally give positive results about 10 weeks after inoculation. Variations in the complement-fixation occur during the course of the disease.

The Sachs-Georgi reaction appears far earlier after infection (about one week), and persists for a greater length of time. Some variations in degree are observed.

VAN DEN BRANDEN (F.), CLÉVERS (Mlle.) & MOREELS (M.). Essai de traitement de la trypanosomiase humaine et des infections animales à *T. congolense* par le " 2754 " Hoechst. [**Treatment of Human Trypanosomiasis and of** *T. congolense* **Infected Animals with " 2754 " Hoechst.**—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 734–737.

" 2754 " is a compound of pentavalent arsenic and contains 27·2 per cent. of arsenic. For the treatment of human trypanosomiasis it is put up in ampoules containing 1, 2 or 3 g. and for animals 8, 10 and 12 g.

Two mules infected with *T. congolense* have been treated.

Case I. On June 10th 1927 the blood was found to contain large numbers of trypanosomes. 8 grammes of the drug were dissolved in 50 cc. of distilled water and injected subcutaneously. On June 14th trypanosomes were still present and the injection was repeated. Three days later the mule had convulsions accompanied by haematemesis and dyspnoea. Trypanosomes were present in large numbers all the time. The animal died the following day.

The second case had a parallel history, but no symptoms followed the injections. Trypanosomes persisted throughout. Subsequently, treatment with Naganol was resorted to.

JAKIMOFF. Ueber die prophylactische Anwendung von Naganol (Bayer 205) bei Kamel-Trypanosomiasis im Ural-Gouvernement. [**The Prophylactic Use of Naganol in Camel Trypanosomiasis in the Ural.**]—*Therapeutische Monatshefte.* 1927. Dec. Vol. 1. No. 6. pp. 189–194.

The campaign against camel trypanosomiasis in the Ural began in 1923. The average mortality amounts to about 25 per cent., but in some places it is as high as 40 per cent.

The principal centres of disease were along the Ural River down to the Caspian, but later the disease made its appearance at widely

distributed centres. The disease has only been known among camels during recent years, and it was probably introduced by the purchase of diseased animals from other parts of the country. An attempt to control the disease by Naganol failed. The author gives two reasons for this failure, namely, that all diseased animals could not be removed during the fly season, and because relapses occurred among camels which had not received sufficiently large doses.

A number of experiments were carried out with a view to testing the prophylactic properties of Naganol, and it was found that doses of 5 to 10 cc. of 15 per cent. solution protected for three months.

KUHN (P.). Ueber die Wirkung von Salvarsan im Futter Durine-infizierter Mäuse. [**The Action of Salvarsan in the Food of Dourine Infected Mice.**]—*Abhandl. a. d. Gebiet d. Auslandskunde. Hamburg. Univ.* Vol. 26. (Series D. Med. & Vet. Vol. 2.) [Festschrift NOCHT.] pp. 256–267.

Although it has been very generally held that salvarsan when administered by the mouth is without effect, results have been obtained which appear to indicate that the contrary is the case. Further investigation is still necessary, but the results so far obtained warrant publication.

The bulk of the paper is made up of tabular statements showing the various experiments carried out. Rats which were inoculated with Dourine and were fed daily for 5 days on bread soaked in a solution of neo-salvarsan containing one milligramme failed to become infected. In the second experiment only half-a-milligramme was administered. This experiment was interrupted, but some of the mice developed fatal trypanosomiasis. Similar results were obtained when the dose was 0·25 mg.

With old salvarsan given in doses of 1 mg. some of the mice became infected and some escaped infection. Similarly, with doses of 0·5 and 0·25 mg. of old salvarsan. In the latter case all the mice became infected.

The experiments were controlled.

Experiments were also carried out in which the drug was not given until the day after inoculation. To some neo-salvarsan was given and to others old salvarsan. The majority of the mice became infected.

A single dose of 1 mg. of either neo-salvarsan or old salvarsan failed to protect any of the mice when given on the day of inoculation.

PARROT (L.) & DONATIEN (A.). Le parasite du bouton d'Orient chez le phlébotome. Infection naturelle et infection expérimentale de *Phlebotomus papatasi* (Scop.). [**The Organism of Oriental Sore in Phlebotomus. Natural and Artificial Infection of** *P. papatasii.*]—*Arch. Inst. Pasteur d'Algérie.* 1927. Mar. Vol. 5. No. 1. pp. 9–21. With 4 plates.

Of 181 female *Phl. papatasii* examined only one was found to contain flagellates in the stomach. Here they occurred in hundreds. Observations in Africa and in Palestine show that the percentage of infected flies is less than 0·1.

The experimental infections of the flies were carried out by allowing them to feed upon lesions of the tail of white mice. The mice were enclosed in fly-proof cages so that only the tails were available to the flies.

GILBERT (S. J.). **A Note on the Experimental Transmission of Theileriosis (Egyptian Fever).**— *Jl. Comp. Path. & Therap.* 1927. Dec. Vol. 40. No. 4. pp. 293–298.

The author briefly summarizes the literature regarding the occurrence of infections due to Theileria in the Mediterranean coast countries, and draws attention to the discordant views that are held regarding the inoculability of the parasite.

In the course of work designed to test the possibility of inoculating against *Anaplasma marginale* in Palestine the opportunity occurred of inoculating pure-bred imported stock with blood containing Theileria, and keeping the animals under observation. Two sets of inoculations were carried out, the blood being obtained from two Jersey bulls which probably contracted theileriasis by tick infection.

The bulls arrived in Palestine in August, 1924, and about a month later were found to be tick infested. All of these were removed, as far as possible, and on examination were found to be *Boophilus annulatus*. Since that time imported animals have been dipped at five-day intervals.

Theileria were first seen in one of the bulls on February 2nd, 1925 and the animal died two days later. With blood from this bull a native yearling was inoculated, the dose being 200 cc. There was a febrile reaction which began a fortnight later. This animal survives and repeated examinations of its blood have shown that the parasite persists in small numbers.

From this calf three shorthorn calves were inoculated on June 7th, 1926. In each of these *B. bigeminum*, *B. bovis*, Anaplasma and Theileria appeared in succession. One of these survives and Theileria is present in its blood in small numbers. In one Theileria appeared on August 16th, 1926 and death took place from tuberculosis and theileriasis on January 29, 1927. The third showed Theileria on August 15th, 1926 and died of sub-acute theileriasis on November 8th, 1926.

The second bull which was naturally infected first showed Theileria on March 20th, 1925, and it passed through an acute attack. It was subsequently slaughtered. From this bull four shorthorn calves were inoculated, one on March 21st and three on May 27th, 1926. One of these died of chronic theileriasis on April 20th, 1926, one of acute theileriasis on September 28th and two of anaplasmosis on June 12th and 26th, 1926.

As a result of these experiments and field observations the author finds that theileriasis as it occurs in Palestine may be acute, sub-acute, and chronic in its manifestations. Blue bodies have only been found in the very acute infections, in which some 90 per cent. of the corpuscles are invaded, but they have not been found in the circulating blood.

In only one of the experimental animals was enlargement of the superficial glands detected, and no Theileria could be found in smears from these.

BOYNTON (W. H.). **Observations on *Anaplasma marginale* (Theiler) in Cattle of California.**—*Cornell Vet.* 1928. Jan. Vol. 18. No. 1. pp. 28–46. With 3 text figs.

Anaplasmosis was first detected in California in 1925, and since then has been detected in seven counties in the State. These localities are free from Texas fever.

The disease was first detected in a herd which had been formed by purchase after the original herd had been slaughtered out on account of foot-and-mouth disease.

Eight animals had died in the course of about 6 months before accurate investigation was begun, and anaplasmosis was suspected by Boynton because of the similarity between the lesions found and those of cases of anaplasmosis which he had examined in the Philippines.

Examination of blood smears from a sick cow revealed the presence of the parasite and evidences of anaemia. Two attempts at infection of other animals by inoculation with blood containing the parasite failed.

Cases occurred on a neighbouring farm the following year and 16 animals died. *Anaplasma marginale* and *centrale* were found.

From this outbreak successful experimental transmissions were made.

The period of incubation was found to be approximately 18 days. Physical symptoms and temperature reaction are not observed until about a week after the appearance of the parasite in the blood. During the febrile period corpuscles may be invaded up to 50 per cent.

The most prominent symptoms of the disease are anaemia, jaundice, constipation, muscular tremors, inappetence, fever and rapid emaciation.

The mortality observed has been high, particularly among milking cows.

The natural transmitter of the disease has not been identified.

SCHILLING (Cl.) & MEYER (K. F.). Piroplasmosen. [**Piroplasmoses.**] —Reprint from *Kolle and Wassermann's Handbuch der pathogenen Mikroorganismen.* 3rd Edit. (Edited by KOLLE, KRAUS & UHLENHUTH.) 1927. Vol. 8. 94 pp. With 34 figs. (7 coloured) & 4 coloured plates.

This reprint from the larger volume gives a digest of existing knowledge regarding piroplasmosis. As the whole subject is covered in eighty-eight pages it will be realised that the subject matter is greatly condensed, more especially as a not inconsiderable number of pages are given up to references.

The paper is illustrated by text figures in half-tone and in colour and by a set of coloured plates.

The authors deal with the piroplasms in general and with the transmitting ticks before proceeding to deal with each disease specifically.

YAKIMOFF (W. L.), MARKOFF-PETRASCHEWSKY (E. N.) & RASTAGAIEFF (E. F.). Zur Frage über die Hämoglobinurie bei Rinderbabesiellosis. [**Haemoglobinuria in Bovine Babesiellosis.**]—*Berlin. Tierärzt. Wochensch.* 1927. Sept. Vol. 43. No. 36. pp. 601–602.

The authors co-relate the existence of haemoglobin in the urine with the type of parasite present in the blood, and they find that it occurs

almost exclusively when the pear-shaped organisms are present, or when pear-shaped and ring forms are simultaneously present. It is not seen when only ring parasites occur in the blood.

STIRLING (R. F.). **Trypanblue and certain Dithio-Aniline Derivatives: Some Clinical Observations upon their Efficacy in the Treatment of Piroplasmosis and other Affections in the Central Provinces, India.**—*Jl. Comp. Path. & Therap.* 1927. Dec. Vol. 40. No. 4. pp. 274–281.

Examination of blood smears of all the animals accessible in a number of villages taken at random shows that 75 to 80 per cent. harbour piroplasms of some kind. As a rule, clinical symptoms are not present, but the animals are in a poor condition, and a not inconsiderable number are extremely emaciated. The most common blood parasites of cattle appear to be *B. bigeminum* and *Th. mutans*.

In dogs the intracorpuscular parasites encountered are *B. canis* and *P. gibsoni*.

Dipping is out of the question in the Central Provinces for various reasons. The owner would not understand the necessity for applying dipping in a thorough manner, and would evade it if enforcement were attempted, the veterinary staff is not adequate to cope with the supervision necessary, and finally, proper dipping cannot be carried out in circumscribed areas where circumstances might otherwise permit it, and it would actually be a source of danger.

The writer therefore decided to try to control the piroplasmoses by drug administrations. Trypanblue was used in 2 per cent. solution. The dye was dissolved by grinding into a paste with a small amount of water, and the bulk was then made up. This solution was filtered through paper and autoclaved at 120° C. for 20 minutes.

The doses used were 40 cc. for horses and cattle and 5 to 6 cc. for dogs. Larger doses frequently caused dyspnoea and some amount of collapse.

The amounts issued have increased from about 10,000 cc. in 1922–3 to 250,000 cc. in 1926–27.

At first injections were given subcutaneously, but subsequently the intravenous path was employed. Abscess formation commonly follows the subcutaneous injection in dogs when it is given on the inner face of the thigh, but when given on the side of the neck, or intramuscularly into the gluteal muscles there is little or no tendency to abscess formation.

The results are judged upon reports submitted by Veterinary Inspectors and assistants, and from these the following extracts are taken :—

Trypanblue is of great value as a general tonic. In milking cows the quantity and quality of milk is increased and better butter is produced. In acute cases of piroplamosis an injection brings down the temperature and clears the circulation of parasites. Even if the circulation remains free a second dose should be given in a week. In chronic cases three doses should be given.

In acute cases early treatment with trypanblue is effective in 95 per cent. of cases. Emphasis is laid on the value of the drug in cases of skin disease.

In foot-and-mouth disease injection of the drug during the acute febrile stage produced rapid improvement.

Six ponies, twelve cattle, three buffaloes, and seventeen dogs were treated by injections of intramine. Blood smears were examined daily and temperatures were recorded. The drug was given in 1 per cent. solution both subcutaneously and intravenously. Parasites disappeared from the blood within 24 hours, and in most cases there was no relapse.

It appeared to be without effect upon trypanosomes.

PICARD (W. K.). Coccidiosis. [**Coccidiosis.**]—*Nederl.-Indisch. Blad. v. Diergeneesk.* 1927. Dec. Vol. 39. No. 6. pp. 468–475.

It has been found that coccidiosis is a common cause of loss among native poultry and pigeons.

MATHIS (C.). Réceptivité des animaux de laboratoire vis-à-vis du Spirochète récurrent humain de Dakar. [**The Susceptibility of Laboratory Animals to the Spirochaete of Recurrent Fever at Dakar.**]—*Bull. Soc. Path. Exot.* 1927. Sept. Vol. 20. No. 8. pp. 826–829.

The author gives an account of animal inoculations with spirochaetes from five cases of recurrent fever. The cases occurred in two Europeans and three natives. All were contracted in the same district and the probability was that it was a single virus. In the absence of a sufficient number of white mice the local grey mouse was used. There is no reason to suppose that this animal is ever naturally infected. In grey mice the strains have been passed through from 9 to 55 passages. As a rule, the inoculations were subcutaneous, but the infection can be transmitted by intraperitoneal or conjunctival inoculation. The period of incubation is about 24–36 hours, and the parasites reach their maximum in the blood in 4 to 5 days. There is no regular periodicity. As a rule recovery is complete in 45 days. The disease runs a course of variable intensity and proves fatal in some cases.

Rabbits can be infected, but they show no visible signs of being diseased. There is not even a rise of temperature. Parasites are very scantily present in the blood.

Cynocephalus and Cercopithecus monkeys have been found susceptible to three of the strains. The others have not been tested, but there is no evidence of illness, and only slight and irregular rises of temperature occur.

HALL (G. N.). **Spirochaetes in the Blood of a Goat.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Feb. 25. Vol. 21. No. 5. pp. 423–425. With 2 text figs.

Spirochaetes were found in small numbers on two successive days in the blood of a goat which was under experiment in connexion with *T. rhodesiense*. The organism appeared to be shorter and more slender than that which is occasionally seen in the blood of sheep. Inoculation of sheep intravenously failed to transmit the parasite. The author proposes the name *Spirochaeta caprae*.

DAPRA (Tullio). Notedi Patologia Veterinaria tropicale. La Spirillosi aviaria. [**Avian Spirillosis.**]—*La Clinica Vet.* 1927. Dec. Vol. 50. No. 12. pp. 741–743.

NOHMI (S.). **Nutritive Observation of Chicken Coccidiosis.**—*Jl. Jap. Soc. Vet. Sci.* 1927. Dec. Vol. 6. No. 4. pp. 360–363. With 2 plates.

PARROT (L.). Sur un parasite intraglobulaire pigmenté de *Tarentola mauritanica* (L.). [**An Intracorpuscular Pigmented Parasite of *Tarentola mauritanica*.**] —*Arch. Inst. Pasteur d'Algérie.* 1927. March. Vol. 5. No. 1. pp. 1–8. With 2 plates.

DISEASES DUE TO METAZOAN PARASITES.

VALADE. La Cysticercose bovine en Syrie. [**Bovine Cysticercosis in Syria.**]—*Rec. Méd. Vét.* 1927. Nov. 15. Vol. 103. No. 19. pp. 813–822.

Cysticercosis of bovines is of very frequent occurrence in the Levant, and constitutes a serious menace to the troops there. The condition may be described as generalized when there is an extensive invasion of the body and localized when only a few cysts occur in one or two organs or muscles. Naturally, there is no sharp line of demarcation between the two and, further, there is no doubt that cases of invasion of the muscles escape detection.

Statistics for the year 1925–26 show that of 615 carcases 16 showed generalized invasion and 100 localized invasion. The figures for the localized invasion are not to be considered exact for the reason given above.

The predilection seats are the diaphragm, psoas, heart, masseter, and pterygoid muscles, and to this list the author feels justified in adding the adductors of the thigh and the deep muscles in the upper part of the neck.

The following tables show the percentage distribution of the infestation :—

Generalized Cysticercosis.

Heart (surface)	68·75
Diaphragm	62·5
Psoas	
Adductors of the thigh	
Heart (myocardium)	50
Superior cervical muscles	
Masseters	31·25

Localized Cysticercosis.

Diaphragm	34
Masseters	27
Heart (surface)	26
Psoas	21
Adductors of the thigh	
Superior cervical muscles	14
Heart (myocardium)	9

The cysts vary from 1 to 2·5 cm. and they appear either as projecting from the surface of muscles or they are deeply placed.

Their liquid contents are ordinarily translucent, but when the condition is generalized and vesicles are numerous, they sometimes have a pinkish tinge.

Carcases affected with the condition in a generalized manner are condemned, as are those with localized infestation if the general condition of the animal is poor. A slight degree of localized infestation does not warrant condemnation.

The causes of the frequency of the infestation are: (1) The large number of the population harbouring *T. saginata*; (2) Ignorance of the elementary principles of hygiene; and (3) Insufficient control of the meat trade.

Meat inspection properly carried out is capable of checking the invasion of the human population, particularly among the troops, but it is a matter of extreme difficulty to tackle the problem from the human aspect. The apathy of the oriental in such matters is well known.

VALADE (P.). L'echinococcose en Syrie. [**Echinococcosis in Syria.**]—*Bull. Soc. Path. Exot.* 1927. Dec. Vol. 20. No. 10. pp. 1004–1019.

The author has been prompted to investigate the problem of echinococcosis in Syria by the publications of DÉVÉ, BAROTTE and VELU, and SENEVET and WITAS regarding this parasite in Northern Africa.

His paper is divided into five sections dealing with (1) abattoir statistics regarding the parasite in bovines and sheep, (2) the occurrence of *T. echinococcus* in carnivora in Syria, (3) the occurrence of human echinococcosis in Syria, (4) proposed sanitary regulations, (5) attempts to diagnose infestation in cattle by an intra-palpebral reaction.

(1) The abattoir statistics have been collected at Homs only. The carcases for the troops have been examined day by day over a period of a year.

The lesions are classified in three groups: extensive lesions, moderate lesions, and slight lesions. These are more or less self expressive.

Of 615 bovines killed during the year about 35 per cent. were infested with cysts. Slight infestations accounted for about 13 per cent., moderate for about 12, and extensive infestations for about 9 per cent. In moderate and severe cases the liver and lungs were involved, and in slight cases the lungs were most frequently invaded.

In the case of sheep the percentage of infested animals was much lower, namely, about 13·5. Moderate lesions were found in about 6·5 per cent., and severe and slight lesions each in about 3 per cent.

Camels are eaten by the Syrians, and the author found that about 50 per cent. of these were invaded by the parasite.

In this species the cysts present peculiar characters. They are usually isolated, seldom exceed in size that of a small plum and are generally not larger than a nut. The cyst wall is almost always thickened—either fibrous or calcified.

The conditions obtaining at the slaughter houses ensure that the multitude of stray dogs in their neighbourhood have every opportunity of becoming infested. Similarly, in the semi-desert country surrounding the towns dogs are used as guards for flocks and herds and have likewise a great chance of becoming infested because animals which die are left where they lie.

An attempt to determine the degree of infestation of the dogs with the tapeworm was begun, but local troubles prevented it from being brought to fruition. Only fifteen dogs were examined post-mortem,

and in none of these was *T. echinococcus* found. Examination of the faeces is of no value in this connexion as the eggs have no specific characters. Enquiries have been put through the medical authorities regarding the frequence of echinococcosis in man in Syria. Generally speaking, they do not encounter many cases of infestation, and their knowledge of the occurrence of the parasite in man is very limited. In the first place the assistance of the surgeon is seldom sought and in the second post-mortem examination is against religious prejudice.

As measures of prophylactic value the author agrees that the proposals of DÉVÉ are valuable. Destruction of as many stray dogs as possible, the construction of proper slaughterhouses, destruction of diseased organs, and regular inspection of meat are the main factors in the control of the disease. None of these can be rendered as effective as the problem demands.

The author has repeated tests upon the lines suggested by LANFRANCHI, using cyst liquid for intradermal tests.

One cubic centimetre of cyst liquid is injected into the skin of the lower eyelid. A positive reaction consists in the appearance, about 2 hours after injection, of an oedematous plaque about the size of a fowl's egg. This extends until it may be sufficiently extensive to cause deformation of the face, as viewed from the front. The swelling persists for 12 hours.

Of 63 animals tested 21 were found to be infested and of these only 7 reacted. The 14 which did not react all showed slight infestations only. One animal which reacted was apparently free from the parasite when examined post-mortem.

WOODLAND (W. N. F.). **On Three New Species of *Avitellina* (Cestoda) from India and the Anglo-Egyptian Sudan, with a Re-Description of the Type-Species *A. centripunctata* (Rivolta), 1874.**—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 385–414. With 4 plates.

Avitellina, like Stilesia, occur commonly in South-Eastern Europe, North and South Africa and India, and is apparently restricted, as regards hosts, to sheep and other ruminants.

In addition to the redescription of *A. centripunctata* the author gives an account of *A. lahorea*, n. sp. *A. soudania*, n. sp., and *A. chalmersi*, n. sp.

A key to the specific diagnosis of the five known species of Avitellina is given. The paper is illustrated with four plates.

WALTON (C. L.) & WRIGHT (W. R.). **Further Observations and Experiments on the Control of Liver Fluke.**—*Jl. Ministry Agric.* 1927. Nov. Vol. 34. No. 8. pp. 734–739.

It has been shown that copper sulphate, applied in a variety of ways, is effective for the destruction of the snails, but information is lacking regarding the circumstances which are adverse to the eggs of the snails. The experiments here briefly described deal with some of these points.

Limnaea truncatula is self-fertile. Oviposition begins about March and continues through the summer. The egg masses contain on an average about a dozen eggs, and may be laid on mud or on leaves. The average period required for hatching is about 3 weeks.

In laboratory experiments egg masses were sterilized by 0·1 per cent. sulphate of copper solution within 48 hours. Drought proved to be the chief natural controlling factor both for snails and eggs.

Egg masses which were allowed to dry naturally could resist desiccation up to 12 hours, while those on the point of hatching resisted desiccation up to 24 hours.

Freezing eggs for a period of three hours failed to inhibit hatching when they were thawed out again.

In an experiment in which natural conditions were simulated, *Limnaea truncatula*, *L. pereger*, *L. palustris*, *Aplexa hypnorum*, and *Planorbis spirorbis*, were used to test the effect of drought. The results showed that *L. truncatula* could survive drying for a longer period than the other species.

L. truncatula and the other species all showed marked resistance to freezing.

AUGUSTINE (D. L.). **Development in Prenatal Infestation of** *Belascaris.*—*Jl. Parasitology.* 1927. June. Vol. 13. No. 4. pp. 256–259.

The author reviews the literature and describes two experiments carried out with bitches, and from one of these it appears that in prenatal infection the development and migrations of the larvae in the foetuses is held up until parturition after which the processes proceed. At parturition the larvae are found in the livers of the foetuses. From one to three days later they are in the lungs, and at 6 days in the intestine.

There appeared to be evidence to suggest that with increasing age an immunity to the parasite develops.

THWAITE (J. W.). **The Genus** *Setaria.*—*Ann. Trop. Med. & Parasit.* 1927. Dec. 31. Vol. 21. No. 4. pp. 427–466. With 20 text figs.

The examination of material in the museum of the Department of Parasitology of the Liverpool School of Tropical Medicine and of material collected by the author in Uganda affords sufficient data for a revision of the genus.

Worms from the following 16 hosts have been available for examination: horse, ass, ox, buffalo, bush buck, eland, waterbuck, impala, reedbuck, puku, topi, hartebeeste, Uganda kob, oribi, duiker bok, klipspringer. Fourteen species are described, of which five are new. Description is also given of 8 species, all named Filaria, which are insufficiently known, but which probably belong to the genus.

BAUDET (E. A. R.). Trichostrongylosis bij kalveren. [**Trichostrongylosis in a Calf.**]—*Tijdsch. v. Diergeneesk.* 1928. Feb. 1. Vol. 55. No. 3. pp. 115–120.

The author describes the post-mortem findings of a calf which died of wasting and diarrhoea. There were parasitic invasions in both the lungs and the alimentary tract. *Cooperia oncophora* was identified among the worms found in the intestine.

BAUDET (E. A. R.). Trichstrongylosis bij den Haas. [**Trichostrongylosis in the Hare.**]—*Tijdsch. v. Diergeneesk.* 1928. Mar. 15. Vol. 55. No. 6. pp. 275–278. With 3 text figs.

The author describes the occurrence of *Trichostrongylus retortaeformis* in large numbers in the intestines of hares in Holland. He ascribes emaciation to their presence, and states that hitherto this parasite has not been found in Holland.

NAIYAMOTO (Tosinoru). **Strongyloidosis Intestinalis of Farrow in Formosa.**—*Jl. Jap. Soc. Vet. Sci.* 1928. Jan. Vol. 7. No. 1. pp. 43–52.

The " white diarrhoea " of young pigs in Formosa is due to the presence of Strongyloides. Two species have been found, *T. suis* (the parasitic generation) or the parthenogenetic females, and *S. westeri* Ihle.

BUXTON (P. A.). **A Parasitic Fibroma on Equines in Samoa.**—*Parasitology.* 1927. Sept. Vol. 19. No. 3. p. 352. With 1 plate.

The dense fibroma-like masses occur frequently on horses and donkeys in Samoa. The predilection seats are the fetlocks and pasterns and less frequently on the face between the eye and the nostril. Deep tissues are not involved in the growths.

In the examination of sections pieces of a nematode are occasionally seen, but this has not been identified. It has not the characters of Onchocerca. The worm may not be causally connected with the growth, but it appears to be probable that it is caused by some parasite since its occurrence seems to be localized to certain parts of the island, and because of the predilection seats in the host.

The disease cannot be native to Samoa since horses were not imported until 1840, and the only native mammals are three species of bat and one rat. The disease is not known to occur in Fiji or in the New Hebrides.

VAN HEELSBERGEN (T.). Helminthiasis bij Kippen. [**Helminthiasis in Poultry.**]—*Tijdschr. v. Diergeneesk.* 1928. Jan. 1. Vol. 55. No. 1. pp. 6–25. With 13 text figs.

This paper is a review of the helminths occurring in poultry, with suggestions regarding treatment.

ROGER, JOUVEAUX & PLATEAU. Mode d'administration pratique des anthelmintiques. [**A Practical Method of Administering Anthelmintics.**]—*Bull. Acad. Vét. de France.* 1928. Jan. Vol. 1. pp. 43–46.

The authors find that horses will take anthelmintic drugs simply mixed with bran mash. In this way they have given doses of 25 g. of carbon bisulphide, 100 g. of carbon tetrachloride, 18 cc. of oil of chenopodium, oil of turpentine 80 to 100 cc. The doses are given twice—morning and evening. The drugs are first thoroughly mixed

in about four litres of water, then bran is added by handfuls and thoroughly stirred with a stick. Six or seven litres of bran are added in this way.

Patients should be on a "sloppy" diet before treatment is begun and they should be starved for 36 hours immediately before.

The rate at which animals take the medicated bran varies considerably. Some—and these form the minority—eat it up quickly, while others eat only a little at a time, and thus may require two hours or more to finish the meal.

Generally, the second feed is eaten more quickly than the first. Animals which will not eat bran containing vermifuges may be persuaded to do so by continuing the starvation and by administering a saline purgative each day. There is no risk attaching to even long starvation if a purgative is given daily.

For oxyuris the authors have given arecolin hydrobromide mixed with powdered charcoal.

HALL (M. C.). **Parasitological and other Observations in Central America.**—*Cornell Vet.* 1928. Jan. Vol. 18. No. 1. pp. 1–18.

In Panama city the following parasites were found at the abattoir: *Cysticercus cellulosae, Macracanthorhynchus hirudinaceus* and *Setaria labiato-papillosa. Haemonchus contortus* was not found. *Cysticercus bovis* was very rarely encountered. The wild pig and domestic swine harbour *Stephanurus dentatus.*

It is remarked that in spite of the fact that *Cysticercus cellulosae* is of common occurrence (5 per cent. of swine) and *Cysticercus bovis* of very rare occurrence (about 0·1 per cent.) the tape-worms of man examined were almost all *T. saginata.*

At Pouonomé there were collected from cattle *Boophilus annulatus, Setaria labiato-papillosa,* and an amphistome not yet identified.

From horses *Amblyomma cajennense,* "cyclicostomes and pinworms."

From pigs, *Cysticercus cellulosae, Hyostrongylus rubidus, Physocephalus sexalatus, Arduenna strongylina,* Oesophagostomum, the kidney worm, and coccidia.

In Nicaragua the parasites found included the following. "From cattle, *Amblyomma cajennense* and the filarid of the body cavity. From the horse—*Dermacentor nitens* and *A. cajennense,* spirurid stomach worms, pinworms, Strongylus spp. and cyclicostomes. From the pig, *A. cajennense, Cysticercus cellulosae,* the red stomach worm, the spirurid stomach worms, kidney worms and nodular worms." No ascarids were found. It is noted that the same condition of ascarides being common in man and rare in pigs prevails in the Philippines.

At San Salvador a goat was found with a light infestation of *H. contortus,* the only case encountered of infestation with this parasite.

WALTON (C. L.). **The Control of Tick Infestation and a Related Disease of Lambs in North Wales.** With Appendix by ROBERTS (R. Alun). —*Parasitology.* 1927. Sept. Vol. 19. No. 3. pp. 265–273.

For many years certain farms have been known to be tick-infested, the tick being *Ixodes ricinus.* The disease of lambs which has been associated with the tick has always made its appearance about a week after these have been sent to certain hill pastures.

Montgomerie says, regarding the disease, " The disease appears essentially to be a pyaemia caused by a mixed infection, the organisms having a predilection for sites in the region of joints. Only lambs are infected and the first symptom may appear eight or nine days after the lambs have been turned to the hill pasture. Abscess formation in the region of one or more joints causes severe lameness. The abscess does not tend to point but develops to a cold abscess. Death may occur in the more acute stages of the disease, but lambs which survive that stage may have recovered by the late autumn." After preliminary failures to burn off the hill sides owing to the wetness of the ground, short interval dipping was resorted to.

It was decided to try to clear the flock by dipping and to eradicate the tick by series of dippings at 5-day intervals. A special " short interval " arsenical dip was used, the dipping was done in the spring, and, when possible, in the autumn also. During 1924, the more experimental period, six dippings were carried out. Prior to dipping a count of ticks from a small number of ewes and lambs showed that the average number per animal was 121. After the 6th dipping, the average number was 2·1. As it was thought possible that the dipping might damage the wool only lambs were dipped up to shearing time in 1925. It was intended to dip all the flock after this, but shortage of water at the end of June made it impossible.

The average number of ticks (for 12 sheep examined) before dipping was 10·16. After dipping the number was 8·9.

In 1926, the average number of ticks per animal prior to dipping was 15·46. The lambs were dipped 5 times and the ewes twice. After dipping the average was 0·96.

SALING (T.). Die Kriebelmückenschäden in Preuszen während die Jahre 1925–1926. [**The Losses due to Gnat-Bites in Prussia in 1925-1926.**]—*Deut. Tierärzt. Wochensch.* 1928. Mar. 3. Vol. 36. No. 9. pp. 133–135.

In 1925 losses were experienced in three areas in Eastern Prussia, and in two in Hanover, and in 1926 in two areas only, one in Brandenburg and one in Hanover. Study of these outbreaks does not furnish any new information regarding the clinical manifestations which follow the bites of the gnats.

SMIT (Bernard) & DU PLESSIS (S.). **The Distribution of Blow-Flies in South Africa, with Special Reference to those Species that attack Sheep.**—*Union of South Africa. Dept. of Agriculture, Bulletin No.* 13. 1927. pp. 1–19.

Myiasis of sheep first made its appearance along the coastal belt in the Eastern Cape Province, but it has now spread all over the country, and it is generally agreed that the state of affairs gets worse every year. The improved quality of the wool is partly held to be responsible for the spread, and it would appear that the habit of attacking live sheep has been acquired by sheep maggot flies in the course of the development of the wool industry. It is not impossible that other flies of allied genera may develop the habit.

The flies are a source of danger as being responsible for the conveyance of diseases both to man and animals.

One species, *Wohlfahrtia euvittata*, or spotted grey locust fly, is beneficial since its maggots are deposited in the egg pockets of the brown swarm locust (*Locustaria pardalina*) and destroy them.

Locust nymphs, while soft after ecdyses, are also attacked by the maggots.

Details are given of the method of collecting data regarding the flies. Eleven species of flies are commonly attracted by decaying meat, and three species have been found to attack sheep.

The only species which have been reared from maggots collected on sheep are *Chrysomyia chlorogyga*, *Lucilia sericata*, and *Chrysomyia albiceps*.

Flies attack sheep during the summer months of October to January, and again during March and April. These are the periods when they are most abundant.

NITZULESCU (Virgil). Contribution à l'étude de la pompe salivaire des Tabanidés. [**The Salivary Pump of the Tabanidae.**]—*Bull. Soc. Path. Exot.* 1927. Nov. Vol 20. No. 9. pp. 846–851. With 4 text figs.

The author's résumé is as follows :—

The salivary pump of the Tabanidae is similar to that of the Simulidae, but it is rather more complicated in that there is lateral enlargement of that portion of the salivary tube which acts as the body of the pump; the more posterior position which it occupies separates it from the hypopharynx.

KOTLAU (A.) & HIRT (G.). *Hyostrongylus rubidus* (Hassall and Stiles) als Urheber einer mit Knötchenbildung einhergehenden Magenenzundung beim Schwein. [*Hyostrongylus rubidus* **as a Cause of Nodular Gastritis in the Pig.**]—*Deut. Tierärzt. Wochensch.* 1927. Jan. 21. Vol. 36. No. 3. pp. 37–40. With 5 text figs.

SUGIMOTO (M.). **On the Nematode Parasite** (*Streptocara crassicauda*) **in the Gizzard of Formosan Domestic Duck.**—*Jl. Jap. Soc. Vet. Sci.* 1927. Dec. Vol. 6. No. 4. pp. 384–386.

TSCHERWAKOW (W. F.). Die parasitischen Cestoden und Nematoden der Hunde in Weissrussland. [**The Parasitic Cestodes and Nematodes of the Dog in White Russia.**]—*Arch. f. Schiffs- u. Tropen.-Hyg.* 1927. Sept. Vol. 31. No. 9. pp. 436–437.

BACTERIAL DISEASES.

SOLOVIEFF (N.). De la cuti-immunisation du cobaye contre le charbon par le procédé de Besredka au moyen des vaccins Cienkovsky. [**The Cuti-Immunization of Guineapigs against Anthrax by Besredka's Method using Cienkovsky Vaccines.**]—*Ann. Inst. Pasteur.* 1928. Feb. Vol. 42. No. 2. pp. 200–205.

The author states that a number of attempts have been made by Russian investigators to repeat the experiments of BESREDKA in the immunization of animals against anthrax by the cutaneous path, but with indifferent success. It appeared to be possible that the vaccines were at fault. He has therefore carried out a series of experiments using Cienkovsky vaccines—which are practically the only ones used in Russia—prepared at the Veterinary Institute at Kharkoff.

In the first experiment 22 guineapigs were used. These were injected intracutaneously with 0·1 to 0·5 cc. of first vaccine. They were then tested with 0·1 cc. of second vaccine (origin not stated). Although the local phenomena were less pronounced in the vaccinated animals than in the controls, and the period of survival was longer, all eventually died.

It was also noted that the evidences of reaction to the vaccination produced by the Russian vaccine were less marked and less persistent than those produced by the Pasteur first vaccine.

Numerous authors have drawn attention to the fatalities that have occurred at different times following the use of the Cienkovsky second vaccine.

As the first vaccine was possibly too weak to be effective, a second experiment was carried out with 38 guineapigs, each of which received several injections of 1 to 2 cc. of first vaccine into the skin.

When these were tested with 0·1 cc. of second vaccine there were 19 survivors.

Five guineapigs which were inoculated subcutaneously instead of intracutaneously all died when tested with second vaccine. The author thinks that the large dose, which was introduced intradermally, and the weight of the guineapigs are important points in determining the results.

Four guineapigs out of five were successfully immunized by giving first increasing doses (0·1, 0·25, 0·5, 1·0 cc.) of first vaccine followed by doses of 0·01, 0·05 and 0·1 of second vaccine.

In one experiment 15 guineapigs which resisted the second Cienkovsky vaccine were tested with 0·1 cc. of 24 hours culture of virulent bacilli in broth, which was fatal to sheep in 0·1 cc. in 48 hours, to a yearling colt in 65 hours, and to guineapigs in 24 to 36 hours.

Of 6 protected guineapigs tested with 0·1 cc. of virulent culture only one died.

The author concludes that the Cienkovsky vaccine protects as well against the virus as against the second vaccine.

DONATIEN (A.), LESTOQUARD (F.), RAMPON (L.) & HILBERT (D.). Immunisation des bovidés contre la fièvre charbonneuse. [**The Vaccination of Bovines against Anthrax.**]—*Arch. Inst. Pasteur d'Algérie.* 1927. Mar. Vol. 5. No. 1. pp. 38–40.

It has been found that the intradermal injection of 0·4 cc. of the second Pasteur vaccine is very effective for the protective inoculation of cattle, whether French, cross-bred, or Algerian. Further experiments were undertaken to see whether the dose could be reduced to 0·25 cc.—the usual dose of the vaccine for cattle.

In a laboratory experiment 0·2 cc. of the second vaccine injected intradermally was found to protect two calves against a virulent inoculation.

It has also been used in the field. Anthrax broke out in a herd of 27 crossbred cows and calves, and three cows died and two were ill. 0·25 cc. of second vaccine was injected intradermally into the caudal fold and the outbreak stopped at once. There were no signs of local or general reaction. In all, 441 animals have been inoculated in this manner and with this dose, and with excellent results. Vaccination against blackquarter can be done at the same time.

KRISHNAMURTI AYYAR (V.). **Studies in Bovine Lymphangitis.**—*Memoirs Dept. Agric. India. Vet. Series.* Vol. 4. No. 2. 1927. Oct.

In the author's view the probability is, but evidence is not forthcoming, that this disease is transmitted by lice. He briefly reviews the possible methods and excludes all save infection via the skin. In his experience the disease is not always associated with the presence of any wounds such as yoke-galls. He attributes the prevailing distribution of the lesions in the superficial glands to the infection via the skin and the relative frequency of the lesions in the various superficial glands to the relative size of the skin area drained by these glands.

He finds that the disease is caused by a small bacillus of the pasteurella type, and he has no difficulty in detecting the organism in smears from early lesions in the glands. The difficulty of finding the bacillus in smears of pus increases with the age of the lesion.

In his description of the lesions the author states that " in the early stages one finds the gland considerably enlarged, tense and indurated. Sections cut from it at this stage when examined microscopically, reveal a great increase in the bands of its reticulum and a gradual conversion of the glandular tissue into a mass of fibrous tissue." When the gland tissue has been almost completely replaced by fibrous tissue suppurating foci are said to appear and to extend into the fibrous tissue. [The pathology of this condition appears to present some anomalous features.—Ed.]

In some cases embolisim of the lungs occurs, and catarrhal pneumonia results. Abscess formation also takes place in the lungs.

Details are given of 17 cases treated with a killed vaccine, but it is difficult to judge of the efficacy of this as no account is given of controls. It may be noted that some animals were discharged as cured after 3 doses, while others required as many as 11. In the latter case the injections were spread over some four months.

KASAI (K.), KOHANAWA (C.), OGURA (K.) & ITO (S.). Ueber den auf der Insel Hokkaido im Norden Japans ausgebrochenen infektiösen Stutenabort. [**The Outbreak of Mare Abortion in the Island Hokkaido, Japan.**]—*Zeitschr. d. Zentralen Veterinär. Gesellschaft Japans.* 1927. Vol. 39. No. 7. pp. 619–668.

The following is taken from a German summary of the paper.

Mare abortion was first investigated by INIWO in 1916. The disease is known to have existed since 1921 in Hokkaido.

It was typical of the 1921 outbreak that the mares aborted suddenly without any premonitary symptoms.

From slipped foals the authors isolated a short bacillus, bacillus coli, and a streptococcus. The bacillus was identical with the Salmonella abortivo-equina isolated in Europe and America. The bacillus tended to be polymorphic in culture. It was gram-negative. In films lightly stained with basic dyes small granules could sometimes be seen in the bacterial bodies. The number of flagella possessed by the organism was somewhat variable and some strains appeared to possess none. The bacillus grew well in media containing bile, urine or faeces. Blood agar was haemolysed, and rabbit corpuscles were more susceptible to haemolysis than horse corpuscles.

In primary cultures colonies were smooth and glistening, but in subcultures they gradually became dry-looking, but this was not absolutely constant. Transference of strains to blood agar caused the colonies to become glistening, and if the organism were grown in liquid media until surface scum formed and then transferred to solid media strains previously giving smooth colonies yielded dry colonies. Subsequently, smooth and rough colonies could be grown which could be kept true to type.

The strains isolated were tested with 29 sugars, and with following results: *positive* mannite, arabinose, xylose, dextrose, laevulose, galactose, mannose, maltose and *negative* erythrite, adnit, dulcite, inosite, rhamnose, tehalose, melibilose, saccharose, lactose, raffinose, soluble starch, dextrin, inulin, glycogen, salicin, phlorizin, saponin, amygdalin, and digitalin. Results with glycerin and sorbite were not constant.

The bacillus did not produce indol, or sulphuretted hydrogen.

The organism retained its vitality in agar at room temperature for 18 months. The addition of glycerin shortened the period of vitality, and the shortening was in proportion to the amount of glycerin added.

The organism was killed in 5 minutes at 60°, in 30 minutes at 56° C.

Carbolic acid in 1·5 per cent. strength was fatal in 5 minutes; and 0·01 per cent. caporit, and 0·001 per cent. sublimate were effective in the same length of time.

Both agglutination and complement-fixation tests were applicable to the diagnosis of the disease.

Four varieties of the organism could be distinguished on the grounds of sugar fermentations.

VAN SACEGHEM (R.). L'avortement épizootique des bovidés au Katanga (Congo Belge) et son traitement. [**Contagious Abortion of Bovines in Katanga and its Treatment.**]—*Bull. Agric. Congo Belge.* 1927. June. Vol. 18. No. 2. pp. 295–302.

The author briefly reviews our knowledge regarding contagious abortion.

He recommends vaccination with living culture for both pregnant and non-pregnant animals, but states that special technique must be employed. A number of injections are to be given at intervals of ten days. His view is that infected animals as a rule abort repeatedly, but that the abortion takes place at a progressively later period of pregnancy.

He recommends a formolized vaccine. Details are not given, but formalin is added in such amount that it proves fatal to the organism only after 48 hours incubation.

TURNER (A. W.). Hépatite infectieuse nécrosante (Braxy, Black Disease) du mouton Australien. Rôle pathogène du *B. oedematiens* (Weinberg et Séguin); reproduction de l'infection; vaccination par l'anaculture. [**Infectious Necrotic Hepatitis (Braxy, Black Disease) of the Australian Sheep. Production of the Disease, Vaccination by Anaculture.**]—*Ann. Inst. Pasteur.* 1928. Feb. Vol. 42. No. 2. pp. 211–224. With 2 text figs.

The disease known as braxy or black disease among sheep in Australia resembles the braxy of Europe only in its clinical and

epidemiological aspects. The Australian condition is a strictly localized disease involving the liver.

In his previous experiments the author had been able to isolate the *B. oedematiens* from cases of the disease in sheep, but had failed to produce the condition experimentally. The strains he isolated were strongly toxigenic, but weakly pathogenic. After numbers of passages of the Australian strain of the bacillus through cultures in nitrate glucose agar a strain was obtained which was highly virulent but feebly toxigenic.

This strain when grown in liver broth proved fatal to guineapigs in doses of 0·25 cc. with the production of a considerable amount of oedema.

There was abundant pleural and peritoneal exudate, and congestion of the organs. The bacillus was discoverable in smears from the oedema, exudates, and organs, and by culture in the heart-blood.

In one out of a batch of 10 guineapigs there was discovered a localized necrosis in the liver. The necrotic centres were from 2 to 3 millimetres in diameter. Histological examination of sections showed that there was marked active congestion of the liver. The liver cells were granular. Here and there areas of coagulative necrosis were recognizable. Here the cells showed no nuclei, the cytoplasm was granular and in many places packed with a brown pigment. In sections stained to show the bacilli these were found almost exclusively in the necrotic areas. They were not, however, disposed round the margin of the necrotic area, nor was there any evidence of a leucocyte barrier. It is suggested that in the natural disease the condition develops more slowly, and thus time is given for the mobilization of the defences. Thus a leucocyte barrier is formed around the necrotic foci.

Details are given of one sheep inoculated with a toxic broth culture in which two large necrotic foci were found in the liver. For some reason which is not given a complete examination was not made of this animal, but smears from the liver showed bacilli like *B. oedematiens*, and the liver sections were very interesting. There was slight active congestion of the liver and granular degeneration of the cells. The necrotic tissue presented the ordinary appearance of coagulation necrosis. Large numbers of gram-positive, non-sporulating bacilli were found in the capillaries in the necrotic centres; they were scantily present elsewhere. Following the lines of investigation laid down by WEINBERG and RAMON the author tested the value of a formolized culture (anaculture) of Albiston's strain of *B. oedematiens* for the protective inoculation of guineapigs and sheep.

Experiments showed that anatoxin prepared from a culture of low toxicity was of no value for protective inoculation. It was found that Weinberg's meat-liver broth was the best medium for the production of toxin.

The preparation of the medium is as follows: 2½ kg. of ox liver, 2½ kg. of beef and 3 kg. of pig's stomach are minced and mixed with 25 litres of tap water and 250 cc. of pure hydrochloric acid in an earthenware pot (enamelled vessels should not be used as the enamelling is often defective). This is heated to 48°–50° C. for 24 hours, and then brought to 80° C. for a few minutes. The following day the liquid is decanted and filtered through Chardin paper. It is distributed to flasks which are filled to the neck and heated to 100° C. for 15 minutes. In this state it keeps well. When required for use a quantity is heated

to 80°–90° C., alkalinized, and autoclaved at 120° C. for 15 minutes to precipitate the phosphates. It is filtered and distributed in deep flasks, so as to give a high column of liquid and again autoclaved at 120° C. for 15 minutes. Incubation should not be prolonged beyond 48 to 50 hours as the toxicity decreases after this.

A small quantity of the culture is withdrawn, filtered through a Pasteur-Chamberland L filter and titrated for toxicity upon mice. The rest of the culture is then centrifuged for 20 minutes at 3,500 in a large centrifuge which is capable of dealing with 4 litres at a time. After centrifugation the supernatant liquid which is not absolutely devoid of organisms is formolized at 3 per 1,000, and then incubated for 10 days at 37° C. It is then tested for innocuity on guineapigs. 10 cc. intramuscularly should not produce more than a transitory swelling.

The culture used by the author when filtered had a minimal fatal dose of ·01 cc. for the guineapig and ·00025 cc. for the mouse. The experiments in connexion with the immunization of guineapigs were to some extent discounted because a considerable number of them died of intercurrent disease, but they showed that there was extreme variation in the degree of resistance to experimental infection even when the same method of immunization was used. But it appeared that 3 injections of anatoxin at intervals of eight days yielded a higher degree of resistance than a single injection.

In experiments with sheep, 5 animals received 3 doses (0·5, 2·0 and 5·0 cc.) of anatoxin at fortnightly intervals. 5 were given a single dose of 5 cc. and 5 untreated controls were included. Two of each batch and two controls were tested with 0·5 cc. of toxic culture 23 days after the last dose of vaccine, and the remainder two days later. The sheep receiving only a single protective dose withstood 2 m.l.d., while those given three doses resisted 2, 4, 4, 10 and 20 m.l.d. There was some variation in the severity of the reactions, but all the sheep had recovered within 4 days.

Of the controls one showed marked oedema but recovered. One died in four days. Of the second batch of controls two died in 2 days and one in three days.

It appears therefore possible that anaculture may prove very valuable.

HUBER (F. L.). Over de immunisatie tegen septicaemia haemorrhagica, in het bijzonder bij den Indischen buffel. [**Immunization of the Indian Buffalo against Haemorrhagic Septicaemia.**]—*Nederlandsch-Indische Bladen voor Diergeneesk.* 1927. Dec. Vol. 39. No. 6. pp. 438–447.

Vaccine B, which is described as a bouillon-aggressine vaccine, and which is prepared at Buitenzorg, is effective in a 5 cc. dose for the immunization of buffaloes. The immunity persists for about a year. It is desirable to have a number of strains of the organism incorporated in the vaccine.

The Indian buffalo is a good producer of anti-serum, and the serum is very effective for cutting short outbreaks. It is said to have curative properties.

HOUDEMER. Sur quelques cas de tuberculose observés chez des animaux domestiques ou sauvages du Tonkin. [**Cases of Tuberculosis in Domestic and Wild Animals in Tonquin.**]—*Bull. Acad. Vét. de France.* 1928. Jan. Vol. 1. (Published by the *Receuil de Méd. Vét.*)

The author has encountered tuberculosis in the following animals in Tonkin: An ox, a dog, a pig, three monkeys, three cats, and one pheasant. The ox had been imported from China.

GÖTZE (R.). Tetanus beim Rinde. [**Tetanus in a Bovine.**]—*Deut. Tierärzt. Wochens.* 1928. Jan. 21. Vol. 36. No. 3. pp. 36–37. With text figs.

The author describes a case of tetanus in a seven-months-old calf. There was marked tympany which was relieved by passage of a trochar. On the third day of the disease 40 cc. of tetanus anti-toxin were given, but without recognizable effect.

NAKAGAWA (S.). Antivirusthérapie et anesthésie locale. [**Anti-Virus Therapy and Local Anaesthesia.**]—*Ann. Inst. Pasteur.* 1928. Feb. Vol. 42. No. 2. pp. 196–199.

The author has carried out, at the suggestion of BESREDKA, a small number of experiments to test the effect of local anaesthesia upon local immunization. The details of three experiments, in which streptococcus antivirus and novocaine were used, are given.

Experiment I. Three guineapigs received into the skin of the abdomen 2 cc. of 0·5 per cent. solution of novocaine. Three were injected with salt solution as controls.

The whole were then dressed with streptococcus antivirus made up in a mixture of lanoline and vaseline.

The following day each was given 0·25 cc. of a serum broth culture of the streptococcus subcutaneously. This culture was fatal to guineapigs in 1 cc. doses in 48 hours.

Two days after the injection a large abscess had formed in each test guineapig.

In the controls the infiltration preceding abscess formation was less pronounced and the abscesses which formed were far smaller.

In the second experiment the same conditions were repeated save that a third batch of guineapigs was added. These received neither salt solution nor novocaine prior to dressing with the anti-virus ointment.

The results were similar to those obtained in the first experiment, and the two control batches of guineapigs responded in a parallel fashion.

In the third experiment the aim was to test whether the effect was purely local.

One batch received novocaine in the skin of the abdomen, and the other in the skin of the back. The controls received no novocaine. The whole were inoculated under the skin of the abdomen.

The results indicated that the injection of novocaine into the skin of the back did not prevent the anti-virus ointment establishing some immunity.

DISEASES DUE TO FILTERABLE VIRUSES.

REMLINGER (P.). Sur la vaccination antirabique au moyen de moelles glycérinées fraîches (méthode de Calmette-Remlinger). [**Anti-Rabic Vaccination with Fresh Glycerinated Spinal Cords. The Calmette-Remlinger Method.**]—*Bull. Soc. Path. Exot.* 1927. Nov. Vol. 20. No. 9. pp. 843–846.

The author states that the method which he described in 1924, namely, the use of glycerinated spinal cords which have been kept in glycerin without any preliminary desiccation is the same as that described by ISABOLINSKY and ZEITLIN, who investigated the method, under the name " Method of Remlinger and Calmette."

The spinal cords of rabbits dying of fixed virus are cut into segments about 1 centimetre in length and plunged into sterile glycerin. They are kept on ice until required. In the Tangier Institute it has been found that cords so treated suddenly become avirulent on the 24th or 25th day, but the power of conferring immunity persists after this, and it appears to be possible that this may be used as a practical method of immunizing.

Treatment of people bitten is begun with injections of avirulent cords which have been in glycerin for 25 to 30 days. And these are followed by injections with cords which have been in glycerin for less than 25 days, the exact dosage, etc., depending upon the number, situation, and severity of the bites.

This method of preparation of the vaccine is a far simpler and more economical one than the older Pasteurian method. ISABOLINSKY and ZEITLIN have tested the method at Smolensk, and of 3,500 persons vaccinated the method has failed in 5 cases only. No case of paralysis has been observed. The author quotes some figures for comparative tests of different methods carried out by ISABOLINSKY and ZEITLIN. The methods of Fermi, Philipps, Hoegyes, Gamaleia and Calmette-Remlinger were those selected, and the results (in each case with 6 rabbits tested) indicated the superiority of the last-named.

MINETT (F. C.). **Immunity in Foot and Mouth Disease.**—*Jl. Comp. Path. & Therap.* 1927. Sept. Vol. 40. No. 3. pp. 173–195.

This paper is divided into two main parts dealing respectively with (1) the standardization of immune serum and (2) the nature of the immunity in foot-and-mouth disease.

The first of these is again subdivided into four sections which deal with (*a*) the production of immune serum, (*b*) standardization *in vitro*, (*c*) standardization by animal experiment, and (*d*) a discussion of the methods available for the standardization of immune serum.

Standardization by *in vitro* methods has not been found to be a method of any great value. Flocculation and complement-fixation, using in the latter case a large variety of antigens, both failed. In the present state of knowledge animal inoculation (guineapigs) is the only valuable method of standardizing the serum. The value of such serum may be expressed either in terms of its virus-neutralizing capacity *in vitro*, or of its capacity to prevent the development of infection *in vivo*.

In the latter experiments the serum and virus were used in a variety of ways. The method most generally employed has been the injection of a series of guineapigs with a series of graduated doses of serum followed by intradermal inoculation of guineapig virus. With a view

to discounting the variations which are inevitable in biological tests reliance must not be placed upon the results of such a series of tests if a single guineapig is used for each dose. Three should be used at least. This is more important when testing ox immune serum as results in this case tend even more to variation.

Storage at a little above freezing point did not appear to reduce the potency of guineapig serum for periods up to a month. With ox serum the potency of the serum stored under the same conditions was not altered up to about 5 months.

Part II. The author briefly describes the conditions of "complete" and "partial" immunity and gives an account of the views held by a number of authors regarding this state of affairs.

WALDMANN and TRAUTWEIN admit that antibodies are produced early, but state that a certain degree of skin immunity can be demonstrated which disappears before that of the blood, since the skin can be re-infected if the proper moment be chosen to produce a local lesion only.

The author puts forward the following explanation of this fact. When the antibody titre is on the wane the skin, being a predilection seat of the virus, would be the first part of the body to regain its susceptibility, but the residual antibody in the blood would prevent the "overflow" of the virus from the local lesion.

"If the view is correct that immunity of the skin may arise from the presence of immune bodies in the blood, then methods which have the effect of increasing the immune bodies without at the same time producing vesicles should also increase the immunity of the skin. There is evidence to show that this is in reality what does happen."

The greater susceptibility of the skin is probably due to the confinement of the virus in tissue spaces from which absorption is comparatively slow, but apart from this it appears to be a fact that certain areas of cutaneous epithelium are specially suitable for the growth of the virus.

This view furnishes an explanation of the appearance of lesions on the hind pads of partially immune guineapigs following intradermal inoculation. And it was found possible to adduce evidence in support by reducing the dose of inoculum used for partially immune guineapigs to the point at which lesions failed to develop, while the same or smaller doses produced lesions in controls. There is evidence to show that a certain degree of skin immunity can be produced by the injection of hyperimmune serum.

The author therefore holds the view that "partial" and "complete" immunity are relative expressions applicable to the same condition of insusceptibility and that there is no reason for postulating a true cellular immunity confined to the skin epithelium.

WAGENER (K.). Experimentelle Untersuchungen über die Tenazität des Virus der Maul- und Klauenseuche in häuslichen und gewerblichen Abwässern und ihre Bedeutung für Hygiene und Veterinär polizei. [**The Persistence of the Foot-and-Mouth Disease Virus in Waste Water from Domestic and Industrial Sources, and its Importance from the Hygienic and Veterinary Police Points of View.**] —*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1927. Nov. 30. Vol. 56. No. 6. pp. 481–493.

The experiments recorded by the author were designed to furnish information regarding the behaviour of the virus of the disease outside the body, and particularly in waste water from laboratories, slaughterhouses, and serum preparation stations.

The results indicated, as has been found by TRAUTWEIN and others, that the virus is not one that readily loses vitality outside the body, but that if tissue is present the virus may retain its vitality for long periods. At temperatures ranging from 17 to 21° C. the virus can remain virulent in water for 14 to 21 days. At temperatures ranging from 13 to 18° C. the virus persisted for periods up to 7 weeks. At still lower temperatures (4–13° C.) it may survive for more than 15 weeks.

It is not only the temperature that plays an important part in connexion with the persistence of virus in waste water, for with higher temperatures bacterial growth is favoured and this appears to affect the vitality of the virus adversely.

The virus also survives better in a medium which approaches to neutral in reaction than in either an acid or an alkaline one.

WAGENER (K.). Infektion und Immunität bei der experimentellen Aphthenseuche des Meerschweinchens. [**Infection and Immunity of Experimental Foot-and-Mouth Disease in the Guineapig.**]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1927. Nov. 30. Vol. 56. No. 6. pp. 494–504.

The author records eight series of experiments in which infective material was administered to guineapigs by different paths. The resulting infections and the immunity caused thereby were studied. As infective material epithelial shreds were taken from lesions in guineapigs at the height of the reaction and ground up in normal saline. The following methods of infection were tested: by way of the stomach, trachea, subcutis, cornea and conjunctiva and by peritoneal, intracutaneous, intracardiac, and intramuscular injection. The virulence of the material used was controlled in every case. Similarly, the material used for the immunity tests was controlled by intraplantar inoculation. The results showed that the cutaneous and intracutaneous inoculations were the most certain methods of infection, as the inoculations succeeded in every instance.

Other methods of inoculation showed success as follows: Intracardiac 86·6 per cent., subcutaneous 76·6 per cent., intramuscular 76, and intraperitoneal 71·9 per cent. In animals inoculated subcutaneously and intraperitoneally, which developed no evidence of infection, no evidence of immunity could be obtained. On the other hand, 6 per cent. of the animals inoculated intramuscularly without producing visible lesions showed some immunity, as did also one out of fifteen inoculated intracardially. Ingestion of the virus produced visible disease in only 3·3 per cent. and intratracheal injection in only one animal out of twelve.

It appears to be a rule of more or less general application to both large animals and guineapigs that the development of visible lesions is essential to the production of immunity.

TRAUTWEIN (K.). Die Pluralität des Maul- und Klauenseuchevirus. [**The Plurality of the Foot-and-Mouth Disease Virus.**]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1927. Nov. Vol. 56. No. 6. pp. 505–555.

This paper is divided into two main parts, one dealing with the variability of the filterable viruses in general and of that of foot-and-mouth disease in particular, and the other with the author's own experiments.

The second part of the paper is subdivided into three parts, dealing respectively with the transmission of virus types to guineapigs. The third part covers experiments regarding the specific characters of the types of virus.

In all 76 strains have been tested and the author finds that they can be grouped into three groups (A, B and C). So far as is known at present the basic difference between the types is a difference in their antigenic properties. This difference can also be demonstrated in passive immunity; that is to say, an antiserum contains antibodies against its homologous antigen only. The serum of animals which have been infected with all three types of virus is plurivalent.

In guineapigs infected successively with the three types of virus positive results approximate to 100 per cent. In pigs about 84 per cent. react to the second inoculation, and 72 per cent. to the third. In cattle the figures were 58 and 37 per cent. respectively. These figures are in the reverse order of the natural susceptibility of the species.

Serologically an analogous condition is seen. While guineapig-immune serum is strongly monovalent against the homologous virus, in cattle 14 days after infection heterologous antibodies were found in 58 per cent., and in pigs in 33 per cent.

The heterologous immune bodies disappear from the serum far more rapidly than the homologous immune bodies.

It is impossible to distinguish between the types on the grounds of virulence, incubation, and clinical manifestations either in naturally susceptible animals or in guineapigs.

PIOT-BEY. Hémosérotherapie de la peste bovine en Egypt et dans le Grand Liban. [**Haemoserotherapy of Cattle Plague in Egypt and Great Lebanon.**]—*Rec. Méd. Vét.* 1927. Oct. 30. Vol. 103. No. 18. pp. 306–310.

The author describes the manner in which he responded to a request from the Government of Great Lebanon to take charge of the protective inoculation of cattle against rinderpest, and gives a brief account of the work done.

In the concluding paragraphs he emphasizes the necessity of maintaining an Institute for the preparation of anti-rinderpest serum in Egypt.

KNOWLES (R. H.). **Contagious Bovine Pleuro-Pneumonia Immunisation.**—*Jl. Comp. Path. & Therap.* 1927. Sept. Vol. 40. No. 3. pp. 230–241.

Inoculation with 0·1 cc. of natural "lymph" into the subcutaneous tissue near the tip of the tail confers immunity, but it has serious disadvantages. It is uncertain in action. It may cause high mortality or it may cause necrosis and sloughing of the tail—a serious matter in a country where flies are numerous.

Inoculation of the virus in cultures has the following advantages. The virulence can be reduced so as to render inoculation safe, without

loss of antigenic properties. Vaccine can be prepared in any amount desired, and freedom from contamination can be assured.

The most suitable "seed" material for culture purposes is pleural exudate. Exudate from the lungs is more turbid and more liable to be contaminated. It is generally unnecessary to filter pleural exudate before using it for the inoculation of culture media.

Marten's broth was used at first for the cultivation of the virus, but the difficulty of getting pig's stomachs rendered a search for a simpler medium desirable.

It has been found that the virus can readily be grown upon ordinary plain broth containing 2 per cent. peptone and 10 per cent. ox or horse serum. Of these two horse serum is the better. The medium is standardized to pH8. New strains can be isolated in this medium.

Knowles's findings regarding the virulence of cultures are at variance with those of WALKER. Knowles finds a decrease in virulence from the first subculture and complete avirulence at the 13th. Evidence is brought to show that the tests carried out with the vaccine were satisfactorily controlled since 17 out of 19 bulls used as controls were markedly susceptible.

At first double vaccination was practised as in Kenya. The first dose, 0·5 cc., was given into the tail and the second 1·0 cc. behind the shoulder. It was found that when the culture virus had become avirulent 2 cc. could be given behind the shoulder with safety.

Experiments are being carried out to test the period required for the development of immunity and its duration. The available facts appear to indicate that a period of four to six weeks is required for the development of strong immunity.

As already noted, cultures became avirulent at the thirteenth generation, but there appeared to be no loss of antigenic power up to the 66th generation. This point has not been thoroughly investigated and further work is required. There is no information at the moment whether the immunity produced by an avirulent culture is as lasting as that produced by an attenuated one.

Cultures used as vaccine were eight days old.

Information is lacking at present how long culture vaccine remains viable.

1,775 animals were vaccinated in the field with only two severe reactions. Statistics are not available to show the effect of these vaccinations upon the incidence of the disease.

FUTAMURA (H.) & WATANUKI (T.). **On the Antigen for Complement-Fixation Test in Contagious Pleuro-Pneumonia in Cattle.**—*Jl. Jap. Soc. Vet. Sci.* 1927. Dec. Vol. 6. No. 4. pp. 364–378.

The authors describe experiments in which a variety of antigens were tested. It is a little difficult to gather exactly what the authors mean at times, and this militates against accurate abstraction.

The authors found that the best antigen was prepared by emulsifying surface colonies obtained on serum agar, and that a glucose-serum-broth culture was also good.

The antigens could be kept at room temperature for periods up to 16 months without losing antigenic power.

TANIGUCHI (T.). **On the Morphology of the Virus of Contagious Peripneumonia of Cattle** (Demonstration).—*Japan Med. World.* 1927. July 15. Vol. 7. No. 7. p. 191.

The author states that the following method of staining gives very satisfactory results. Apparently cultures are used. Films are prepared and fixed "in the usual manner." They are immersed in 5 per cent. chromic acid for one minute. Wash thoroughly. Stain with giemsa made up with 2 drops per cc. for 3 hours or more. Alternatively, the slide may be heated to 55–60° C. for 5–10 minutes and then cooled on ice for 5–10 minutes. Wash and dry. "The organisms are stained intensively bichromatic." They are round, oval or coccobacillary in shape and measure from 0·2–0·4μ in diameter. They may be arranged as single organisms, diplococci, or clusters of various kinds. In old cultures the spiral or vibrio-like forms are found.

FINDLAY (G. Marshall). **Immunological and Serological Studies on the Viruses of Fowl-Pox and Vaccinia.**—*Proc. Roy. Soc.* Series B. 1928. Feb. 1. Vol. 102. No. B718. pp. 354–379.

The author's conclusions may be summarized as follows :—

Three strains of fowl-pox have been studied. Two of these were pathogenic for the fowl only and one for the fowl and the pigeon. Attempts to render these strains pathogenic for rabbits, rats, calves and ducks failed. The three strains of fowl-pox were mutually protective, but pigeons were only partially immunized against the strain virulent for the fowl and pigeon by previous inoculation with fowl strains.

Inoculation with fowl-pox confers immunity and hyperimmunization produces a viricidal serum, but such a fowl-pox anti-serum acting on a virus pathogenic for the fowl and the pigeon destroyed its pathogenicity for the fowl only.

Vaccinia virus and fowl-pox virus show no cross immunity, and the former cannot be transformed into the latter. The respective antisera are not heterologically viricidal. Fowl-pox virus passes through a Berkefeld V filter readily, but vaccinia virus does not.

REPPIN (K.). Die Infektiosität des Blutes simultangeimpfter Meerschweinchen bei Maul-und Klauenseuche. [**The Infectivity of the Blood of Simultaneously Inoculated Guineapigs in Foot-and-Mouth Disease.**]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1927. Nov. 30. Vol. 56. No. 6. pp. 556–563.

MYCOTIC DISEASES.

DAUBNEY (R.). **Bovine Lymphangitis or Tropical Actinomycosis.**—*Jl. Comp. Path. & Therap.* 1927. Sept. Vol. 40. No. 3. pp. 195–216. With 8 text figs.

The author gives a review of the rather scanty literature regarding bovine lymphangitis and then describes an outbreak which occurred in 1925. Clinically, the cases encountered in Kenya did not differ from those described by other authors, and some slight cases recovered after surgical treatment. Four severe cases came under detailed

observation at the laboratory. These cases are described at length. From three of them—no detailed examination was made of the fourth —a streptothrix was isolated which Daubney identifies as an Actinomyces, probably *A. farcinicus* (Nocard 1888).

The organism was detectable in smears and sections stained by Ziehl Neelsen and Carl Spengler's stain, but it was rarely present in large numbers. It shows slight thickening of the ends of the filaments but no large club-formation. The organism is aerobic and grows fairly well on common media. The first colonies make their appearance in about 3 weeks. Young colonies are white, but later become fawn-coloured. A rather dry medium favours growth and cultures remain viable for months. Glycerin-potato-agar is said to be the most suitable medium. The organism does not blacken lead acetate, nor alter the reaction of litmus milk.

Experimental inoculation of guineapigs produced lesions similar to those described by NOCARD as caused by the Guadeloupe strain, and a typical case was produced in one out of two cattle inoculated with culture.

NANSOUTA. Au sujet du traitement de la lymphangite épizootiqué par le biiodure de mercure. [**The Treatment of Epizootic Lymphangitis with Biniodide of Mercury.**]—*Bull. Soc. Path. Exot.* 1927. Sept. Vol. 20. No. 8. pp. 829–830.

The author has tested a method suggested by PLANTUREUX of combining the administration of the drug per os with subcutaneous injections, a method which he claims is superior to the subcutaneous method of treatment devised by Nansouta.

Only one case has been treated in this way. The animal was given 10 centigrammes of the drug in bolus daily for 12 days, and the treatment was repeated after an interval of a week. Recovery took place without other treatment in a month.

MISCELLANEOUS.

NICOLAU (S.) & GALLOWAY (I. A.). **Preliminary Note on the Experimental Study of Enzootic Encephalo-Myelitis (Borna Disease).**—*Brit. Jl. Exp. Path.* 1927. Aug. Vol. 8. No. 4. pp. 336–341. With 4 figs. on 3 plates.

The authors have worked with a strain of virus isolated by ZWICK from horses and with one obtained from sheep by MIESSNER, and they are of the opinion that the two are identical.

The virus cannot be sedimented by centrifuging, and it is rendered inactive by a few minutes exposure to ultra-violet rays.

In rabbits the weight of the animal appears to be the determining factor in connexion with receptivity.

A point of special importance in infected animals is the loss of weight, which may be half the original weight of the animal. Inoculation with the virus produces no fever, but there may be a fall in temperature prior to death. The only constant alteration found in the blood is a marked increase in the number of lymphocytes.

Contrary to the findings of ZWICK and MOUSSU, the authors have been able to produce the typical train of symptoms by intrasciatic inoculation—these symptoms being preceded by paralysis of the inoculated leg. Intratesticular inoculation is successful. Intra-ocular and intravenous inoculations are uncertain, and intratracheal injection appears to fail to infect.

Inoculation by scarification failed, but if the brain were simultaneously irritated by an intracerebral injection of sterile saline infection occurred. If the saline were injected into the spinal cord skin scarification did not lead to localization in the central nervous system.

The guineapig is susceptible, but the period of incubation is far more variable than in the rabbit. The longest period observed was 130 days. Rats are susceptible, but young ones are far more resistant than old ones. Mice are more resistant than rats.

Passage through rats or guineapigs appears to exalt the virulence of the virus for the rabbit.

Successful inoculations into monkeys were made (*Macacus rhesus*).

In infected rabbits the authors find the lesions described by other writers in the central nervous system, but also infiltrative and degenerative changes in the spinal ganglia and peripheral neuritis.

It is possible to confer a durable immunity upon rabbits by intracerebral inoculation with attenuated virus.

A fuller account of the disease is promised in a complete memoir.

NURNI (K.) & AOKI (M.). **Experimental Studies on Osteomalacia in the Horse. Second Report. Etiological Significance of Calcium Deficiency in the Diet. Part II.**—*Jl. Jap. Soc. Vet. Sci.* 1927. Dec. Vol. 6. No. 4. pp. 345–359. With 4 plates.

In a previous report the authors showed that osteomalacia could be induced by a diet comprising barley alone. In the experiments recorded here two groups of horses were used. To one of these a diet of barley was given, while the other received in addition calcium salts. The animals were not exercised and were deprived of sunlight. The content of the blood serum in calcium and inorganic phosphorus, and the calcium, phosphoric acid and magnesium contained in the urine and faeces were ascertained. After post-mortem examination ribs were subjected to chemical analysis.

The metabolism of the horses fed upon barley only showed profound changes as evidenced by the analysis of the urine and faeces, while the addition of calcium carbonate to the diet of barley resulted in the metabolism being normal.

ROSE (A. L.). **Osteomalacia in Cattle in New South Wales.**—*Australian Vet. Jl.* 1927. Dec. Vol. 3. No. 4. pp. 122–127.

Osteomalacia occurs enzootically in New South Wales, and analyses of soils and grasses have shown that the phosphoric acid content of these is definitely lower in areas where osteomalacia occurs than elsewhere.

" Bone-chewing " as seen in Australia is the first symptom of osteomalacia, but the depraved appetite also shows itself by the chewing of things other than bone.

The disease is always more manifest in milking cows than in other stock, the drain on the animal's system affording a natural explanation of this. The deficiency shows itself, as is also to be expected, in the calves.

The evidence regarding the seasonal occurrence of the disease is conflicting, but generally speaking, it is most marked in the coastal areas in late winter and early spring. Rainfall does not appear to be a determining factor.

The geographical distribution of the disease cannot as yet be defined with certainty, but there is more information regarding this in connexion with the coastal areas which have been farmed for milk for many years than in the inland pastoral districts. The disease is most evident in the granite districts, and least in the basalt and volcanic areas. All flat river country is sound.

The post-mortem reveals lesions in the bones only, and it is noticeable that although the ribs are not weight-bearing bones they are frequently the site of fractures. After the ribs the defect is most pronounced in the transverse processes of the lumbar vertebrae, the pelvic bones, and those of the limbs. The sequelae may be mechanical in origin, such as choking with pieces of bone or other foreign body, pericarditis and pleurisy following the swallowing of nails, wire, etc., and, finally, parabotulism.

It has been suggested that sterility may result from phosphorus deficiency, but field inquiries do not tend to support that view.

Preventive and curative measures involve the supply of the deficiency in the diet whether that be phosphorus or lime or both.

The ideal way of combating the disease is by top dressing with superphosphate at the rate of one hundredweight per acre. This not only affects the health of the animals, but ensures an abundance of better feed and increases the carrying capacity of the farm. All fodder crops should also be dressed with superphosphate. If superphosphate is not used a ration of 2 lbs. of bran per day will prevent bone chewing. Alternatively, a lick containing the required minerals may be provided, and bone meal is the best form in which to supply these.

PHISALIX (M.). Indépendance des propriétés antirabiques et antivenimeuses du sang des Couleuvres Aglyphes appartenant au genre *Coluber* Lin. [**The Independence of the Antirabic and Antivenom Properties of the Blood of Snakes belonging to the Genus** *Coluber*.] —*Bull. Soc. Path. Exot.* 1927. Dec. Vol. 20. No. 10. pp. 986–988.

Madame Phisalix has compared the serum of *Coluba helena*, *C. porphyriacus*, *C. aesculapii* and *C. scalaris* from the point of view of their venom, antivenomous and rabicidal properties.

She finds that the powers are independent.

STOCKMAN (Ralph). **Soya Meal as a Cattle Food.**—*Jl. Comp. Path. & Therap.* 1927. Dec. Vol. 40. No. 4. pp. 266–273.

In 1916 Stewart STOCKMAN reported on a fatal outbreak of illness in cattle which he attributed to feeding upon Soya bean meal from which the oil had been extracted. The matter was left in a somewhat indeterminate condition.

The subject has been taken up again by Ralph Stockman, who has carried out experiments with guineapigs and rabbits.

Before resorting to animal experiment a very thorough chemical examination was made of the beans and meal used. No alkaloids or other active principle and no poisonous albumose could be detected. The beans used contained 20 per cent. oil, 4·4 per cent. ash, and the meal 1·1 per cent. oil, 10·5 per cent. water, and 5·6 per cent. inorganic ash.

Emphasis is laid upon the fact that guineapigs are especially susceptible to scurvy and require large quantities of anti-scurvy vitamin, while rabbits have so far proved to be immune to scurvy on any experimental diet.

Both rabbits and guineapigs become emaciated very rapidly if suitable proteins are not supplied in sufficient amount, but in the absence of growth promoting vitamins (A and B) the most favourable ration fails to serve its purpose and nutrition and health suffer. While the results obtained with one species of animal upon a certain diet cannot be held to be applicable to other species on the same diet certain helpful indications may be gleaned from such experiments.

Guineapigs, when fed exclusively on soya beans or meal, died in two to five weeks from malnutrition and showed lesions of scurvy. Rabbits died in two to three months, but there were no lesions of scurvy.

In comparative experiments made with oats, lathyrus grains, and bran, death took place in guineapigs in about the same time, but signs of scurvy were exceptional.

Rabbits fed upon lathyrus throve, while those fed on bran lost weight and died of inanition. There was no evidence of scurvy.

Reckoned as protein, fat, carbohydrate, and salts these substances appear nourishing, but there must be some inherent defect in them which renders them insufficient as diet. By the addition of anti-scorbutics, such as orange juice, or cabbage juice, to the soya diet, scurvy was prevented in guineapigs, but death occurred as before.

Germination of soya beans also prevented the development of scurvy, but did not make the beans a diet that would maintain health. Fresh cabbage added to soya beans made a proper diet, but boiled cabbage failed to correct the defects of the soya. The fresh cabbage must contain a nutrition promoting substance. This substance was found by experiment to be absent from substances containing vitamins A, B and D, orange juice (vitamin C).

The protein of soya bean, although unsuitable for rabbits, and proteins of cereals, beans, soya, turnips and potatoes have been shown to contain too little of the amino-acids lysin, cystin and tryptophane. So far as guineapigs and rabbits are concerned these deficiencies can be made good by the addition of fresh cabbage.

In the cases recorded by STOCKMAN (S.) scurvy was produced and was the cause of death. The diet was soya meal, oats, bran, and hay. The fact that the animals fed on grass in the open for a short time daily does not invalidate this conclusion. The grass feeding occurred in the winter, when there would be no antiscorbutic weeds.

The fact that pigs and sheep did not suffer is explained by the fact that the diet was suitable to their needs, and they are not liable to develop scurvy.

The absence of cases in cows not in milk is explained by the fact that antiscorbutic vitamin is excreted in milk.

SEDDON (H. R.). **Bone Chewing and Carrion Poisoning (Osteophagia and Botulism and Parabotulism).**—*Australian Vet. Jl.* 1927. Dec. Vol. 3. No. 4. pp. 136–141.

In this paper the author deals briefly with the conditions governing the appearance of bone chewing. Analyses are given showing the P_2O_5 present in the soil and vegetation in affected and non-affected areas.

Tabular statements show the results of experiments in which calves were fed with and without bone meal, and after a time the rations were changed over, those which had the bone meal at first being deprived of it, and those which did not have it receiving it. In each case there was a very marked increase in weight of those receiving the meal. The daily ration of bone meal was 30 grammes (about an ounce). In another experiment the effect was tried of bone meal alone as compared with bone meal together with salt and sulphate of iron. Controls received no minerals.

It was not evident that the addition of iron and salt had any effect.

The author reviews the investigations which led to the incrimination of the *B. parabotulinus* as the determining cause of the paralytic symptoms following the ingestion of bones and decomposing animal matter. Cases of carrion poisoning occur without antecedent osteophagia. Botulism has been observed in horses fed with hay or chaff from mouse-infested stacks, and it has been shown that dead mice in such stacks furnish the conditions necessary for the growth of the bacillus.

BARLOVATZ. Les petits grossissements en microscopie pratique. [**Low Magnifications in Practical Microscopy.**]—*Bull. Soc. Path. Exot.* 1927. Oct. 12. Vol. 20. No. 8. pp. 753–758.

Whereas in the laboratory the microscope is used for the thorough examination of organisms, its use in general diagnostic work is something quite different. Here the aim is the rapid detection of organisms whose presence is suspected. In the field, where large numbers of examinations have to be made, minutes are of importance.

Clearly in the examination of any preparation the more fields that have to be searched the longer the time necessary, and the rapidity with which a specimen can be searched is inversely proportional to the square of the diameter of the field of the microscope, provided, of course, that the time necessary to search individual fields remains constant. When it is necessary to search the fields carefully for the detection of parasites the saving is less obvious than when parasites can be detected at a glance. If the magnification be reduced still further the parasites may be readily recognizable when found, but it may be difficult to detect them. Another advantage of working with low magnifications is that they entail less fatigue to the eyes.

When the light is poor it is easier to work with low powers than with high ones.

By the use of two huygenian oculars (I and IV) and two objectives (No. 3 and No. 6) it is possible to get a range of four magnifications which are appromately 50, 100, 225 and 450. For the great majority of intestinal parasites a magnification greater than about 100 is not necessary. The eggs of helminths and protozoa can be detected readily in the faeces under this power.

Malarial parasites, and particularly in thick films do not require a magnification higher than 225, if the preparations are well stained.

It is rather more difficult to detect trypanosomes in gland juice, and, further, in such preparations trypanosomes disappear rapidly. It is a constant rule that if a slide be examined twice with an intervening interval of 5 minutes, fewer trypanosomes will be found at the second examination than at the first.

Examinations of moist preparations have shown that the number of trypanosomes detected in a given time is approximately the same whether the magnification be 225 or 450. With a magnification of 100 the number detected is fewer. If cells are numerous in the films the figure given by a magnification of 100 only will be still smaller.

A magnification of about 200 is also recommended for the enumeration of leucocytes in cerebro-spinal fluid.

REPORTS.

VELU (H.) & BALOZET (L.). Rapport sur le fonctionnement du Laboratoire de Recherches du Service de l'Elevage au Maroc pendant l'année 1927. [**Annual Report of the Research Laboratory, Morocco, for 1927.**] (Type-written copy.)

The research work has been hindered by shortage of staff, multiplicity of routine duties, and insufficiency of experimental animals.

Rabies. It has been found that the Japanese method of inoculation confers a certain amount of immunity upon dogs, provided the vaccine used is freshly prepared. The immunity is not sufficiently strong to permit the general use of the method in Morocco. But advantage has been taken of the immunity thus established to inject dogs with fresh fixed virus and thus establish a solid resistance.

Blackquarter. An outbreak occurred in the Ksiri region in which vaccinated animals died. It would appear that the strain responsible for this outbreak is a particularly virulent one.

REVIEWS AND NOTICES.

MALKMUS (B.). Grundries der klinischen Diagnostik der inneren Krankheiten der Haustiere. [**Clinical Diagnosis of the Diseases of Animals.**] 10th Edition. Bearbeitet von Dr. Th. OPPERMANN.—pp. vii+243. With 66 text figs. & 1 coloured plate. 1928. Leipzig: Dr. Max Jänecke, Verslagsbuchhandlung. [8·60 R.; Bound 9·50 Rm.]

That this book has passed through ten editions since it was first published in 1898 is evidence of its usefulness. Contrary to what is the case with some books, the successive editions have not very greatly increased in size, and the present volume is still literally a "handbook."

The primary object of the book is to ensure that diagnosis shall be based upon a collection of information ascertained by systematic examination of the patient, and it is pointed out that by proceeding in this it is possible to arrive at three kinds of diagnosis, namely, a definite diagnosis, a probable diagnosis, and a possible diagnosis.

The generalities of the subject are first dealt with, and in the later portions of the book the examination of the various organs and systems is dealt with in detail. The correct method of performing each examination is described and the significance of the various observations made explained. The illustrations are for the most part to the point. The diagrams indicating regional anatomy, in connexion with the information to be gained by percussion, are useful. A few of the illustrations are perhaps of less value, as for example, that showing the eggs of *Distomum hepaticum* in the faeces of the sheep (p. 153), and that showing a horse with chronic hydrocephalus (p. 197). In the section devoted to the detection of parasitic invasions it is noticeable that old nomenclature is still adhered to.

To the erratum that is given at the end of the index referring to the various degrees of fever in the horse, ox, and dog, there should be added one regarding the cellular content of the blood of the different domesticated animals, for on pp. 226–226 the figures for red and white corpuscles are given as for a cubic centimetre of blood instead of a cubic millimetre.

The book can be recommended strongly as being a good guide to that systematic examination which can alone lead to results which will stand.

A. Leslie Sheather.